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SCIENCE NEWS LETTER

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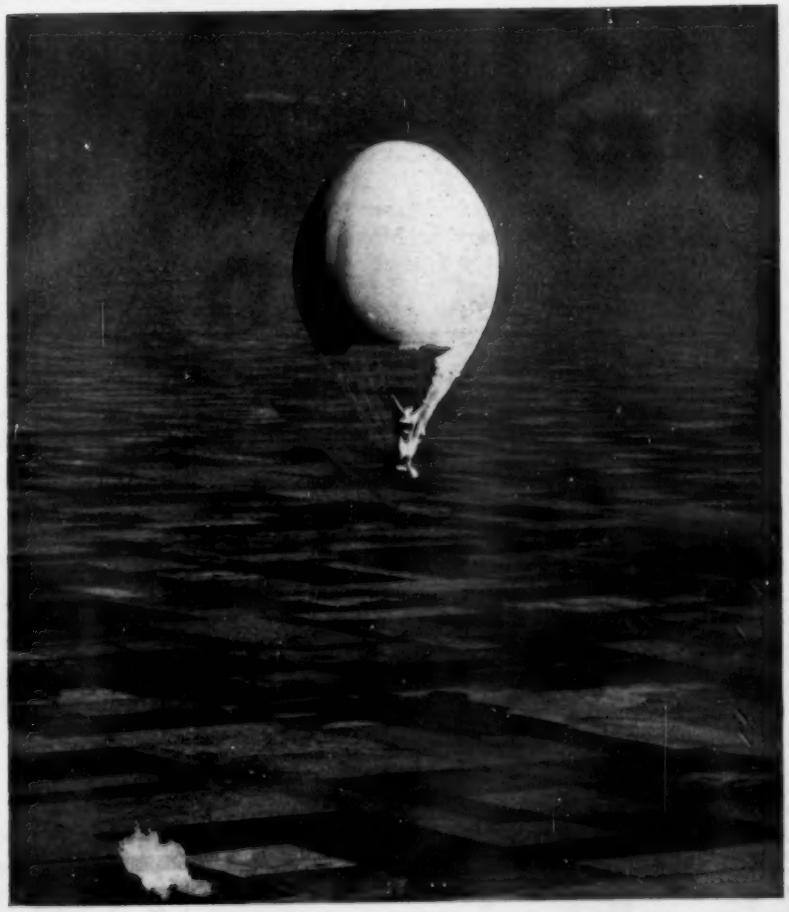

AUGUST 4, 1934

How Long Will It Hold Together?

See Page 67

A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

VOL. XXVI *No. 695*

The Weekly Summary of Current Science

Published by

SCIENCE SERVICE

The Institution for the Popularization of Science organized under the auspices of the National Academy of Sciences, the National Research Council and the American Association for the Advancement of Science.

Edited by WATSON DAVIS

Subscription rates—$5.00 a year postpaid; two years $7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old, 25 cents.

Canadian and Foreign subscribers please add $1 a year to regular subscription rates to cover postage.

In requesting change of address, please give your old address as well as the new one in notification to Circulation Department, SCIENCE NEWS LETTER, 21st and Constitution Ave., Washington, D. C., at least two weeks before change is to become effective.

Advertising rates furnished on application.

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Publication Office, 1930 Clifton Ave., Baltimore, Md., Editorial and Executive Office, Constitution Ave. at 21st St., N. W., Washington, D. C.

Address all communications to Washington, D. C. Cable address: Scienserve, Washington.

Entered as second class matter October 1, 1926, at the post-office at Baltimore, Md., under the act of March 3, 1879. Established in mimeographed form March 13, 1922. Title registered as trade-mark, U. S. and Canadian Patent Offices.

DO YOU KNOW?

Yellow fever is endemic at present in western Africa and tropical South America.

Grapefruit were introduced into Florida by the Spaniards as early as the sixteenth century.

One-fifth of the beds in general hospitals in this country are used for patients with chronic diseases.

Paris has a cageless zoo, where even the wildest animals are separated from visitors only by wide, deep trenches.

Boundary lines of the Navajo reservation, heretofore somewhat vague, have been fixed by a new act of Congress.

A farm tractor controlled by radio from the farmhouse is being exhibited at the Century of Progress in Chicago.

To study cosmic rays, Soviet scientists will have a laboratory on Mount Alagoz in Armenia, 14,400 feet above the sea.

The largest American bats, found in Brazil, have a wing spread of over two feet.

When brass corrodes there is an actual change of composition of the alloy at the corroded points, with a loss of zinc.

The egg of a marbled Murrelet has been found on Vancouver Island, and is said to be the second egg of this bird ever discovered.

The land bridge of the Isthmus of Panama first linked the Americas about 20,000,000 years ago, according to a geological estimate.

Thirteen deer, shipped from Mount Vernon to the Shenandoah proposed national park, have been released in an ideally wild home.

Government chemists have made an alkaline ink that seems to be harmless to paper, in contrast to deteriorative effects of acid writing inks.

WITH THE SCIENCES THIS WEEK

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Who has the official record for altitude in the stratosphere? p. 68. *Exploring the Upper Atmosphere—Dorothy Fisk — Oxford,* 1934, $1.75.

ARCHAEOLOGY

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What color is Saturn? p. 74. *The Earth and the Stars—C. G. Abbot—Van Nostrand,* 1935, $3.

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ZOOLOGY

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These curiosity-arousing questions show at a glance the wide field of scientific activity from which this week's news comes. Book references in italic type are not sources of information for the article, but the references for further reading. Books cited can be supplied at Book Department, Science News Letter, at publishers' prices, postpaid in the United States.

AERONAUTICS

Stratosphere Hop Experience Suggests Use of Robots

Automatic Radio Sets Sent Aloft in Small Balloons Transmit Upper Air Data; Might Have Wider Use

See Front Cover

STRATOSPHERISTS Kepner, Stevens and Anderson: Let us all hope that you have the chance to probe the stratosphere again. Although thrilled by your adventures, we hope next time you have a softer and slower landing.

While this elaborately planned National Geographic-U. S. Army flight is having its results written into aeronautic and scientific history, consideration should be given to the possibility of allowing robots, inanimate instruments that speak by radio, to undertake the hazardous task of rising higher than man can go to report on conditions in the stratosphere.

Smaller Cost

It costs relatively a few dollars and it risks no human lives to make free pilot balloon ascensions that may well break the Settle-Fordney altitude record. Light weight, efficient radio transmitters can be carried upward, varying their message according to the pressure, temperature and humidity they encounter. Radio transmitting balloons were successfully used last year in the Arctic to get weather information from high in the air.

Visits to the stratosphere could, in fact, become a daily occurrence. Lieut. W. H. Wenstrom of the Signal Corps, U. S. Army, has been making a study of radio sounding balloons at the California Institute of Technology and has indicated the feasibility of meteorological observations by use of such instruments.

A knowledge of the vertical distribution of pressure, temperature, moisture, direction and velocity of upper air winds is essential to "air mass" meteorology, and these data are expected to lead to precise weather forecasting.

Airplanes carry meteorographs recording pressure, temperature and moisture, are in general use. The direction and velocity of upper air winds are obtained by the use of free pilot balloons which are observed from the ground.

Airplanes carry meteorographs recording pressure, temperature and moisture, up to about 15,000 feet. On their return the data are evaluated and ready for transmission to weather stations within an hour or two after they are obtained. Occasionally a free sounding balloon carrying a recording meteorograph is used, but data can only be obtained when and if the balloon is recovered which may be days after the observations.

With the use of a free balloon to which a small radio transmitter is attached, pressure, temperature, and humidity even in the stratosphere can be obtained. The radio transmitter is ingeniously arranged so that the signal emitted is a function of pressure, temperature, and moisture. Bearings taken on the radio balloon in flight by one or more directional radio receivers on the ground will give its position at any time from which the height of the balloon and direction and velocity of the winds may be calculated.

For Bad Weather

At present the cost of production of a radio sounding balloon exceeds the cost of an airplane flight, but Lieut. Wenstrom is very optimistic about the future use of radio sounding balloons. During bad weather when airplane flights cannot be undertaken, meteorological observations are most desirable. A radio balloon can be released in any weather and it will rise to much greater heights than could be negotiated by an airplane with an instantaneous reception of the data on the ground.

Larger balloons carrying more instruments could be sent to the stratosphere for a fraction of the cost of manned stratosphere attempts. The thrill of human life endangered would be lacking. Through repeated flights, through the constant ingenuity of scientists, the information to be obtained would undoubtedly equal and even surpass that which it was hoped to obtain in the recent valiant effort.

A supposed advantage of manned balloons over a sounding balloon for taking upper air data is that the former can be leveled off at different altitudes. In cosmic ray research it is helpful to have a series of readings every 1,000 or 5,000 feet. A sounding balloon rushes upward so fast that many automatic instruments cannot keep up with it.

A bit more thought on some method of dumping ballast at intervals should, however, make possible the desirable steplike flight in a sounding balloon.

WHEN THE GONDOLA HIT!

The crash of the stratosphere balloon "Explorer" at moment it hit the ground. The ring in center is one of dust created by the impact of gondola. Directly above and still in the air are the parachutes of two of the fliers. Between the parachutes are white specks of balloon fabric floating to earth. The farmhouse is that of Reuben Johnson near Holdrege, Neb. The epic photograph was made by Master Sergeant Gilbert from an accompanying Army plane piloted by Lieut. J. F. Phillips. The above photograph and that on the cover are copyrighted by The National Geographic Society.

AERONAUTICS

Stratosphere Fliers Faced Perils in Voyage to Upper Air

Of the Fifteen Who Have Attempted to Reach Man's Highest Altitudes, Only Eleven Have Come Back Alive

THE NARROW margin between the falling stratosphere balloon "Explorer" without fatality to its occupants, Major W. E. Kepner, Capt. A. W. Stevens and Capt. O. A. Anderson, and a disaster that might have killed the daring men emphasizes the hazards of stratosphere ascensions.

Despite the fact that stratosphere ascensions have been linked with governmental agencies and scientists from their inception and every effort made to foresee possible danger, the perils and risks of venturing ten, twelve or fifteen miles into the upper athmosphere hardly make the trip a joyride.

Beginning with Piccard and Kipfer and ending with the take-off of the recent flight, fifteen persons have gone into the stratosphere. All have come back, but only eleven have come back alive.

Prior to Piccard's 1931 flight with its record of 52,000 feet, the altitude mark for free balloons was 35,424 feet. Captain Hawthorne Gray, of the United States, made two attempts in 1927 to break it. His first record of 42,470 feet was declared unofficial because he descended by parachute. On his second trial he was killed. These flights were made in an open balloon, not a closed gondola.

While Piccard and Kipfer reached 52,000 feet in 1931, Piccard repeated the flight in 1932 with Max Cosyns as aid and gained an altitude of 54,166 feet.

Then came 1933—the stratosphere year. In April Commander T. G. W. Settle, U. S. N., received permission to begin construction of a balloon bag containing 600,000 cubic feet volume—100,000 cubic feet greater than the capacity of Piccard's bag.

At the same time Russian balloonists entered the stratosphere picture, to give the flights an international aspect, with plans to build a huge bag containing a volume of 800,000 cubic feet.

On August 5, 1933, to the accompaniment of a World's Fair celebration which lasted almost all night, Commander Settle took off solo but landed a few minutes later in the railroad yards of Chicago. The first "flop" had come into stratosphere flying.

Speeding construction and spurred by the preparations of Commander Settle, the Russian balloon was ready on Sept. 25, 1933. This bag, the U. S. S. R., failed to get off the ground that day, but on Sept. 30 reached an altitude of 62,324 feet. Although a record for altitude, the flight was unrecognized because Russia was not a member of the international aeronautical body sanctioning such flights.

Then in October news leaked out that Russia was planning still a larger balloon, the Sirius, with a volume of a million cubic feet. Before this new Soviet bag was complete, however, Commander Settle, accompanied by Major Charles L. Fordney, U. S. M. C., took off on Nov. 20 and came down the next day in a New Jersey bog after reaching 61,243 feet, an official record.

Up to 1934 the "box score" for stratosphere flights stood at four successes and two failures. Success came twice to Piccard, once to the U. S. S. R. and once to Settle and Fordney.

The year 1934, however, saw the turning of stratosphere luck from good to bad. The Russian balloon Sirius was ready on Feb. 1 and sailed away over fog-enshrouded Moscow. It came back with a record of 67,508 feet but in pieces and without its three occupants. The first fatalities had come to stratosphere ballooning.

Then, early in May, 1934, the German balloon Bartsch von Sigsfeld, engaged in the prosaic task of taking air samples near the bottom of the stratosphere at 32,800 feet, crashed with fatal results to its aerial occupant.

Ton of Instruments Carried

When the trio of stratospherists took off from Moonlight Valley on the National Geographic Society—Army flight, the gondola carried not only the weight of the three men, but also approximately a ton of scientific instruments. The gondola, built of magnesium alloy to be as light as it could be was nevertheless "trimmed" like a scientific Christmas tree with apparatus which covered the inside and outside and even hung by long ropes beneath.

What luck scientists will have in salvaging data from the twisted mass of instruments inside the gondola of the stricken "Explorer" is problematical.

Thirteen major objectives were outlined for the flight in addition to the unattained altitude record. They were:

1. Collection of stratosphere air samples at many levels.
2. Taking of complete temperature and barometric data from the ground to the highest point attained.
3. Aerial photographs to check curvature of the earth, also the customary barometric system of measuring altitude.
4. Cosmic ray data with both electroscopes and Geiger-Muller counters.
5. Wind velocity measurements.
6. Check of solar radiation intensity.
7. Photographs of the sun's spectrum.
8. Determination of ratio between sky brightness and sun brightness; color of sky at high altitudes.
9. Tests on actinic effect of light.
10. Effects of altitude on radio transmission.
11. Effect of radiation, both solar and cosmic, on fruit flies as check on possible mutations.
12. Same for spores.
13. Technical problems of balloon navigation.

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PHYSIOLOGY

Test of Saliva Detects Intoxication

A SIMPLE test of saliva may come into use as a means of telling whether a person is intoxicated.

A method of determining the amount of alcohol in the saliva after alcoholic beverages have been drunk was reported by Dr. Theodore E. Friedemann of the University of Chicago to the Society of Biological Chemists. Dr. Friedemann found that after drinking, the alcohol finds its way as quickly to the saliva as to the bloodstream and in some cases even faster.

This means that it will no longer be necessary to take a sample of blood from a man's vein to determine the amount of alcohol in his system. Testing for alcohol in the blood is sometimes resorted to in settling questions of drunkenness.

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METEOROLOGY

Midwest Drought Shows Up In Water Levels of Rivers

Gauge Readings on Little Rock, Mississippi, and Red Rivers Show Lowest Level Ever Recorded for July

THE UNPARALLELED drought in the midwest, soon to enter its fifth month, is showing up in the water levels of the great rivers—the Mississippi, the Missouri, the Arkansas and the Red—which are approaching new low marks at many stations.

At the Little Rock River gauge on the Arkansas readings are the lowest in the history of the station. The readings, prosaically told in Weather Bureau tables as minus 3.2 feet, reflect what is happening in the 158,000 square miles of land drained by the river above this point.

At St. Louis, where river height records go back 74 years to 1860, the gauge reading is the lowest for the month of July in the history of the station. And the same statement holds for the past four months of March, April, May and June.

The Mississippi and its tributaries (principally the Missouri) above St. Louis drained 691,000 square miles of land now drought-stricken.

Down at Shreveport, La., on the Red River levels are low for July but a bit above the all-time low recorded in November, 1932. 60,000 square miles of land are drained by the Red River at this point.

Low in Summer Significant

M. W. Hayes of the River and Flood Division of the Weather Bureau warned that low levels taken indiscriminately throughout the year do not necessarily mean drought for at many stations low marks come in the winter months when the particular stream under consideration may be frozen as well as its tributaries. Low marks for summer months do have great significance, however.

"Gauge readings of very low stages," Mr. Hayes declared, "are a guide to the volume of water passing down a river but they are not an infallible guide simply because the cross-section area of a river often changes either because of silting or erosion." Frequent discharge observations, or measurements of the amount of water carried by a river, are a better guide, he said.

The Great Lakes reflect the dry spell in lower levels. Only Lake Superior is higher than the 10-year June average.

The U. S. Lake Survey Notice to Mariners of the War Department for June lists Lakes Michigan and Huron as 1.59 feet lower for that month than the average level for June during the last 10 years. Lake Erie is 1.89 feet lower by the same standard. Lake Ontario is 1.96 feet lower.

Low lake levels bring trouble for certain harbors whose normal depth of water is just a bit more than the deepest draught lake steamers. A drop of one foot sometimes means a large boat may be unable to maneuver properly in the harbor.

Park Geysers Affected

Frequent newspaper items to the effect that the geysers of Yellowstone National Park are losing their power have called forth a protest from Horace M. Albright, formerly director of the National Park Service and for ten years superintendent of the Yellowstone.

These statements, Mr. Albright insists, do not tell the whole story. It is a well-known fact that the geysers and hot springs of Yellowstone Park do fluctuate from year to year, depending upon various natural conditions. Their apparent lessening of volume this year, or irregularity of action, as the case may be, he declared during a recent visit to Washington, is just another result of the drought. Geysers are formed through the collection of ground water, and when drought conditions prevail the geysers suffer, along with the wheat and the corn and other products of nature. When normal rainfall prevails, the geysers respond as do the crops.

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Two explorers will make a sledge journey 800 miles eastward across the Greenland ice cap, after which they will explore the mountain region north of Mount Forel.

"T'AIN'T NO SIN"

This young lady was not actually following the hint of the song and "dancing around in her bones." She merely stepped, fully clothed, before the piercing X-Ray in the Eastman Kodak X-ray research laboratory. In one second, this result, a beautiful life-size and full length portrait, was obtained. It is on exhibit at the Century of Progress.

ORNITHOLOGY

Apoplexy Leading Cause Of Death Among Birds

APOPLEXY caused one-fifth of the deaths among birds in a group of cases reported to the British Aviculture Society. Pneumonia, concussion of the brain and enteritis were the other leading causes of death in this list.

If these facts surprise bird fanciers and veterinarians, it only bears out the contention of Dr. Donald R. Skillen of La Canada, Calif., that more should be known of bird diseases.

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METEOROLOGY

Midwest Prairies Linked With Hot Sahara Desert

Persistent High Pressure Area Spreads Clear Across Atlantic and Makes Cooling Storms Detour to North

SCORCHING heat over the entire West, from the Mississippi to the Rockies and from the Canadian border almost to the Gulf, can be blamed on a pile-up of high barometric pressure over the North Atlantic Ocean, which hangs on persistently, and shunts possible cooling storms far toward the north, to spend their treasures in Canada.

The outlying edge of this barometric barricade cuts across the Southeastern states, and is immediately responsible for the sufferings of citizens and renewed peril to crops. But the whole high-pressure area spreads clear across the ocean, and links the sweltering prairies with the mirage-shimmering sands of the Sahara, in Africa, for the same lines of barometric pressure that lie across Kansas and Iowa, run also through the world's greatest desert.

This feature of late July's record-breaking heat and its causes was explained by Charles D. Reed, senior meteorologist of the U. S. Weather Bureau office in Des Moines.

The same persistent heated area, devoid of any storm-bringing "lows," was also responsible for the long delay in the U. S. Army-National Geographic stratosphere balloon flight, Mr. Reed added. The normal procession of "highs" from the Pacific coast or Canada was interrupted, and until one of these moved across the bowl in the right relationship, the balloon could not be launched safely. Furthermore, the sudden rising of small local "blubs" of hot air might cause spotty thunderstorms, which would make the flight of the enormous fragile bag of hydrogen altogether too risky.

Clockwise Circulation

Returning to the causes of the heat, Mr. Reed said: "The wind circulation around any area of high barometer in the northern hemisphere is clockwise, that is, the wind circulates around the center in the direction of motion of the hands of your watch. Hence the wind circulation over the Mississippi and Missouri valleys on the border of a great high pressure center such as I have described is from some southerly direction with great persistence.

"Moreover, this large high pressure area affords stubborn resistance to the areas of low barometer commonly known as storm centers which in their normal course move from west to east across the United States. Striking this high pressure barrier, the low pressure centers either disintegrate or are shunted far northward into Canada.

"Normally as these centers of low pressure pass eastward there are intervals of northwesterly winds bringing the cooler temperatures of the northern latitudes into the Midwest, but when these low-pressure areas are thus broken up or deflected, there is no respite from the southerly winds and scorching sunshine, and there is a cumulative effect of heat from day to day that sends the thermometer higher and higher.

"Finally, some force not fully understood by meteorologists breaks up the great high-pressure center over the Atlantic and restores the normal eastward procession of low-pressure centers across the Midwest."

Hot August Expected

A hot August may be expected to follow hot July in the central part of the United States, if temperature correlations observed by Mr. Reed hold for this year as they have in the past. July mean temperatures for Iowa this year have averaged about eight degrees higher than normal July means; and Mr. Reed's statistics indicate that when the excess is only three degrees the chances of a hot August following a hot July are about 100 per cent.

The conditions for Iowa are paralleled fairly closely by conditions throughout the West and Midwest; so that sweltering humanity and suffering crops and livestock do not have a particularly consoling prospect for late-summer comfort.

There is also a strong probability that rainfall will be deficient in August, for Mr. Reed's statistical studies disclose a correlation between July heat and August drought in past years. This correlation, however, is not quite so strong as that between above-normal temperatures in the two months.

Danger to the corn crop has been allayed considerably by numerous timely local rains, so that the prospects for a droughty August are not as alarming as they might otherwise be, except in southern Iowa where the corn is already given up for lost.

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CLIMATOLOGY

If America Becomes Desert It Will Not Be In Our Time

PERSISTENT drought and abnormal heat, returning annually for several summers, have again raised the question whether America is being turned into a desert. There is a shuddery thrill in such speculations which some people seem to enjoy a great deal.

It is not likely that camels will be substituted for cows in Nebraska in anything like our own time; and all the shieks one is likely to see in Ohio will continue to be of the corner drugstore variety. Sweeping long-time changes in climate have occurred, but they have always been measurable in terms of millenia rather than of mere decades.

There was, apparently, a persistent warm period in Europe during the earlier Middle Ages. It had enough effect to make the colonization of Iceland and Greenland possible. When colder winters returned, about the fourteenth century by the best available records and conjectures, the Greenland colonies were quite literally frozen out, and the hopeful infant settlement in Vinland, on the North American mainland, perished.

In the interior of the North American continent, also, there seems to have been a longer period of drier, warmer climate than that which we now regard as normal. Whether or not this coincided with the Viking settlement period is not known. But evidence for its existence has been interpreted by Prof. Paul B. Sears of the University of Oklahoma, on the basis of pollen deposits he has found in bogs in the Ohio Valley and elsewhere.

During this dry-warm period, Prof. Sears has suggested, the Corn Belt, then an affair of Indian cultivation, may have migrated eastward, following the retreating forests. At its close, when cooler-moister climate made high tree

growth in the Ohio valley again possible, the cultivation of corn, and the particular Indian culture-type dependent on it, would have to return to the prairies.

There is some support for Prof. Sears' suggestion in the distribution of the great mounds and other culture remains of the prehistoric Indian people now known as the Hopewell type, from the Ohio site first explored for their remains. First known at this, its easternmost extension, Hopewell culture has been traced in northern Illinois and eastern Iowa.

If subsequent work of American archaeologists demonstrates that the western extension of this ancient Indian civilization was not contemporaneous with the eastern, but either preceded or followed it—or both preceded and followed it—it will at least establish the fact of an advance and a recession in a culture-tide. Then it will be up to the paleoclimatologists and the paleobotanists to seek evidence for or against correlated advance and recession in the climate, and in the vegetation types dependent on it.

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CHEMISTRY

Experiment With Chemical For Dissipation of Fog

WHEN Massachusetts Institute of Technology scientists sprayed fog away experimentally by means of a chemical shower, it was the latest of many experiments aimed at conquering fog.

The problem of fog dissipation has become more important with the increasing use of airplanes. Flying is impossible or dangerous when fog covers landing fields. But even before air transportation became important, scientists were fighting fog.

As yet Henry G. Houghton, Jr., who conducted the M. I. T. fog spraying tests at Round Hill, Mass., has not told the compositions of the chemical solution sprayed as a curtain of tiny drops to drive the fog away from a limited volume of space.

The trick of the spray is to condense the water vapor making up the fog and make it fall to the ground as fine rain. Such a scheme will be effective for a very limited area.

The system may prove to be useful at a busy airport, to which the airplane pilot could be guided by radio beacons.

Electrical precipitation, which has proved effective in treating industrial dusts, smokes and fumes, was tried on fog in England and California many years ago. American and British air forces have tried sprinkling various water-attracting dusts in the air, and electrified sand has also been used. The U. S. Navy at Philadelphia built elaborate machines for spraying electrified water drops into foggy air to cause the fog particles to come together and fall. And at Lyon in France and Pittsburgh, Pa., oil was placed on rivers in the hope of checking evaporation and preventing the formation or troublesome fogs.

Some of these attempts were partially successful on a small scale but as yet no fog dissipating process has been practical. Attempted rain production is often a variation of fog dissipating processes.

Radio landing beacons combined with airways radio beacons, as developed by the U. S. National Bureau of Standards, are the most successful means of combatting fog, not by removing it, but by allowing the pilot to find his way through it to successful blind landings.

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MEDICINE

Swine May Be Reservoir For Fatal Pseudorabies

SWINE may be the reservoir for pseudorabies, an acute, highly fatal disease of cattle, cats and dogs, Dr. Richard E. Shope has found from investigations made at the Rockefeller Institute for Medical Research.

The disease of cattle is caused by a virus. It can be given to rats, rabbits, guinea pigs and other animals by injecting the virus into the animal, but how it spreads naturally has been something of a mystery.

Following the discovery of a European investigator, S. Von Ratz, that pseudorabies occurs naturally in wild swine, Dr. Shope began studying the disease in relation to domestic swine, he explained in his report to the current issue of *Science*.

Injecting the virus under the skin of these animals or swabbing it inside their noses produces the disease. But, unlike cattle, swine have a very mild form of pseudorabies and do not die of it. Dr. Shope suggests, therefore, that the disease is naturally transferred from one animal to another via the nasal route. The swine have the disease in such a mild form that the farmer may not recognize it or even may not know that any of his swine are sick.

Yet from this reservoir in the swine the disease may be transferred to the cattle. In Dr. Shope's opinion this explains the sporadic and highly fatal cases of pseudorabies that occur among cattle in the swine-raising states of the Middle West.

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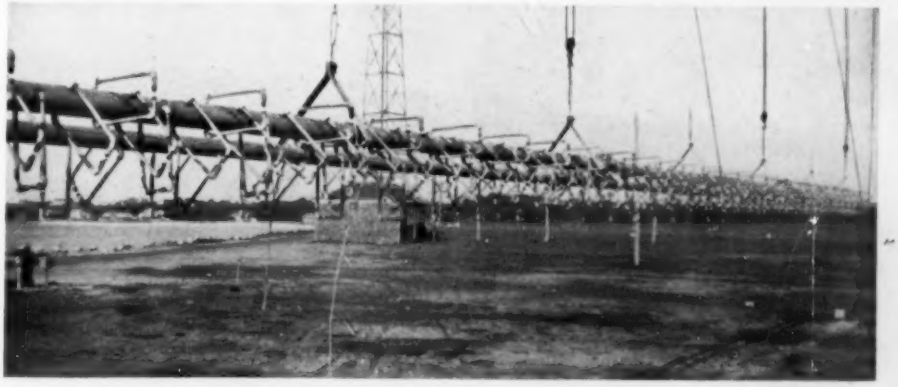


TO DRIVE AWAY FOG

Apparatus being tested at the Massachusetts Institute of Technology to determine its possibilities as a dissipator of fog. The pipes and nozzles composing the system are shown here before they were elevated to their working height of 30 feet above the ground. The chemical sprayed by this device will condense and precipitate the water vapor, clearing fog from the airport on which it is installed, it is hoped.

MEDICINE

New "Cold Light" Aids In Cancer Diagnosis

A NEW aid for diagnosing cancer and other diseased conditions of the breast is a powerful "cold light" which enables physicians to see through the tissues and observe directly the tumors or other abnormalities.

Clinical trial of the lamp has been made at the tumor clinic of the Michael Reese Hospital, Chicago, under the direction of Dr. Max Cutler, who terms it "a simple, safe and valuable aid."

Transillumination, seeing through body tissues with the aid of a strong light, is not a new procedure in itself, but this new lamp, powered by a 750-watt bulb, is said to provide much more intense light than other lamps hitherto used. A wall of circulating water cools this lamp so that it can be applied directly to the skin with safety and comfort for the patient. This enables the physician to bring the light close to the tissues he wants to see.

Technical and mechanical problems in the construction of the lamp were worked out in the laboratories of the General Electric X-Ray Corporation.

Science News Letter, August 4, 1934

PUBLIC HEALTH

Amebic Dysentery Germs May Be Filtered From Water

THE CYSTS which transmit amebic dysentery can be filtered out of water by the usual filtration methods used to purify water supplies, tests conducted at the Chicago Experimental Filtration Plant showed.

Chlorination is not a practical method of freezing the water from these organisms, Dr. Bertha Kaplan Spector of the U. S. Public Health Service and John R. Baylis and Oscar Gullins, chemists of the Chicago Department of Public Works, found.

Chlorine and chloramine kill the cysts, but the amount necessary is more than could be used in a public water supply. Chlorine is more effective than chloramine in killing the cysts, the tests showed.

The outbreak of amebic dysentery in a Chicago hotel last fall and the possibility that it was caused by contamination of the hotel water from an unknown source emphasized the importance of knowing more about Endamoeba histolytica, the organism that causes the disease. It is particularly important to know more about this germ's life outside the human body, how it is transmitted and means of safeguarding the public from the infection, the scientists pointed out in the report of their tests issued by the U. S. Public Health Service.

Cysts were used for tests of water purification methods because they are generally considered the transmittable stage of the organism. Waste material containing these cysts was added to samples of water which were then treated with aluminum sulphate to coagulate the solid matter and filtered through rapid sand filters of a size and type found in many filtration plants throughout the country. All cysts were removed from the water by the treatment.

Science News Letter, August 4, 1934

ICHTHYOLOGY

Sea-Bottom Valley May Be Fish Migration Highway

VALLEYS in the ocean floor may serve as migration routes for fish, as valleys on land similarly serve man and other animals in their journeys. There seems to be evidence that a deep submarine valley in the extreme North Atlantic is thus used by codfish, which have long been known to wander between West Greenland and Iceland.

Dr. A. Vedel Taning, of the Marine Biological Laboratory, Copenhagen, who has been investigating sea-life in northern waters with the Danish Research Ship *Dana,* states that a submarine ridge seems to follow the East Greenland coast. In the trough formed by the ridge along the coast flows the ice-cold East Greenland current; outside, or over the ridge, is the warm Atlantic water with temperatures up to eight degrees Centigrade.

Dr. Taning, in a communication to the scientific periodical *Nature,* suggests that the cod migrating from West Greenland to Iceland, follow the ridge, where the temperature of the water is such as they like best.

The submarine ridge is about 230 meters deep and about twenty to thirty miles from the coast-line. The soundings so far made indicate a continuous ridge from about 64 degrees latitude North to Cape Farewell.

This new discovery of the relief of the sea bottom was made with the echo-sounding apparatus which is now in general use.

Science News Letter, August 4, 1934

IN SCIENC

CHEMISTRY

Chicken Feathers Make Pens, Buttons, Insulators

CHICKEN feathers may come into the market disguised as fountain pens, buttons, and various novelties now made from other plastic materials if the research carried on at Iowa State College becomes commercialized.

Immense quantities of chicken feathers are produced every year. Many of these are utilized in such well-known articles as pillows and feather beds but large quantities go to waste.

Research work in the Chemical Engineering Department of Iowa State College, at Ames, has shown that these feathers may dissolve in caustic soda and then be thrown out of solution in a new form by acids. This new material may be molded to any shape and hardened by formaldehyde.

The finished material is said to be fairly hard, very elastic, an excellent electrical insulator, and resistant to water, heat, dilute acids, and alkalies. Somewhat similar plastics are being made commercially from milk casein.

Science News Letter, August 4, 1934

PALEONTOLOGY

Fossil Finds Will Show Age of Fiji Islands

A STUDY of fossil discoveries in the Lau Islands of eastern Fiji will undoubtedly disclose the geological ages of these South Sea isles and relate them to other land areas of the Pacific region.

This is the progress report in the current issue of *Science* of Dr. J. Edward Hoffmeister, professor of geology of the University of Rochester, and Dr. Harry S. Ladd, of the U. S. National Museum, regarding the expedition of the University of Rochester to the Fijis. The exploration party has been in the South Seas since February and will stay until September.

The exploration was under the auspices of the Bishop Museum, Honolulu.

Science News Letter, August 4, 1934

NCE FIELDS

AERONAUTICS

Airship May Be Stalled, But Fall Does Not Result

GIANT airships can be "stalled," W. B. Klemperer, engineer of the Goodyear-Zeppelin Corporation revealed in a report published in the current issue of the *Journal of Aeronautical Sciences.*

"Stalling" an airship is a term derived from airplane parlance. An airship "stall" is a strange flight condition in which the efficiency of the ship as a load carrier is greatly reduced and often the controls act differently from their normal response. It does not fall, however, as would an airplane.

The airship "stall" may be either temporary or permanent. As a passing incident in flight the stall will lead, says Mr. Klemperer, either to a return to normal flight or to a catastrophic loss of control and, perhaps, a crash.

Stalled flight in an airship, however, may be a stable form of motion maintained either permanently or deliberately. The elevator controls, which make the airship climb or dive, act as though reversed when this form of flight is going on.

Science News Letter, August 4, 1934

ARCHAEOLOGY

Identity of City's People Found in Debris

BURIED under debris at the foot of the famed seven-story pyramid at El Tajin, in the Vera Cruz jungle, beautiful stone carvings have been discovered which shed a new light on the city's ancient history.

Mexican government archaeologists, directed by Enrique Jaun Palacios, found over twenty of these large stone blocks beautifully decorated with bas reliefs. The stones may have tumbled down from the top of the pyramid, if they once adorned a temple there, as is thought likely.

The discovery convinces Sr. Palacios that the Totonac Indians now living in the region are a later, cruder immigrant race whose ancestors did not build the ancient city. The artistry of the carvings points to handiwork of Toltec or Mayan Indians who had very high aboriginal civilizations in tropical America. The art work of the two civilizations was similar in many ways.

Among the bas reliefs are many representations of the Toltec feathered serpent god, Quetzalcoatl. One large slab carved with a mythical "tree of life" is much like that found at the remarkable "Temple of the Cross" at the early Mayan city of Palenque.

A seven-foot stone idol at the bottom of the great stairs once stood apparently in an important place on the pyramid. This stone figure has features of the rain god, but also the snake's eyebrows and feathers which belong to the feathered serpent, god of the wind.

A ball court is another important discovery at El Tajin. The court is the third found in the city's ruins, and by its old-fashioned construction dates back to Mexican early times.

Science News Letter, August 4, 1934

ENTOMOLOGY

Insects Are Electrocuted In New Research Traps

ELECTROCUTION is the latest method of controlling orchard insect pests at Massachusetts State College. Prof. A. I. Bourne, Stewart D. Edmond and Prof. C. I. Gunness are studying the effectiveness of five electric insect traps in a local apple orchard to determine the practicability of the method on a wide scale.

Each trap consists of a double wire screen enclosing a 75-watt frosted bulb. The light attracts insects at night but as they fly toward it they come in contact with the electrified screen wire. Current at 110 volts cremates them.

Some are only killed, however, and fall to a tray beneath the trap. The present installation of five traps is already known to have killed 1,300 insects in a single night, not counting those so completely destroyed that identification was impossible.

The many potential uses of such traps, Dr. Bourne declares, are only now becoming known. Besides destroying many insects the traps are useful in determining spraying schedules, as an examination of the catch each morning will show when the various insects pests are beginning to appear and their relative prevalence and distribution.

Science News Letter, August 4, 1934

METEOROLOGY

Hot, But Healthy, Sums Up Climate of Boulder Dam

BOULDER DAM, with a recorded highest temperature of 128 degrees Fahrenheit, takes second place only to the famous "hot spot" of Greenland Ranch, in Death Valley, Calif., which once reached 134 degrees. In the winter the temperature at Boulder Dam has dropped as low as 22 degrees, making a range between recorded extremes of 106 degrees. July maximum temperatures average 113 degrees, and minimum temperatures 89 degrees.

Yet in spite of the heat, the region around Boulder Dam is going to be a good place for the development of great industries, and it will even be suitable for resort purposes in autumn, winter and spring. So declared George V. Sager, of the U. S. Weather Bureau, before the meeting of the American Meteorological Society.

The heat, he explained, is not noticed as much as it might be, since the air is always dry. In a well-ventilated building it is possible to do a good day's work, and there are few nights when sound sleep is not possible. Furthermore, within two hours' run by automobile there are mountain heights ideal for the development of summer residences and resorts.

Science News Letter, August 4, 1934

ENGINEERING

Study of Porous Materials Helps Air-Conditioning

SMALL quantities of air, on the order of the amount that passes through the walls of a cigarette while it is being smoked, can now be measured with great accuracy.

Of particular use in air-conditioning of houses is a small machine which has been invented that can determine in a very short time if a sheathing paper meets requirements as to the amount of air that can leak in or out through it.

S. T. Carson of the National Bureau of Standards, who developed the instrument, has found that it has a range about a thousand times greater than most similar devices for measuring permeability. It can be used on leather and insulating materials as well as such thin membranes as a cigarette paper.

Science News Letter, August 4, 1934

ASTRONOMY

Saturn Visible All Night

Two Other Planets, Venus and Mars, May Be Seen In The Early Morning At the Beginning of the Month

By JAMES STOKLEY

TWO PLANETS are now in the evening sky, though one, Jupiter, which has been with us for months, sets early, and will soon be out of sight for a while. Saturn is the other. On the eighteenth of the month it will be directly opposite the sun, and then will be visible all night, rising at sunset and setting at sunrise. It is in the constellation of Capricornus, shining low in the southeast, as indicated on the maps. Because of its brightness, greater than any nearby star, and its steady, yellowish light, it can be easily recognized. Jupiter is low in the west, and still brighter. Close to its left is the star Spica, in the constellation of Virgo, much fainter.

The Great Dipper this month hangs in the northwestern sky, the handle pointing upward, and it makes a good start from which to find the star groups now visible. It is well known how the pointers, the two stars at the bottom of the bowl, indicate the pole star, Polaris. If you imagine a line drawn through these stars to the right, it brings you to Polaris, itself at the end of the handle of the Little Dipper, which now extends upwards. In the northeast, directly opposite the pole star from the Great Dipper, is the group of Cassiopeia, shaped like a W on its side, the top of the W towards the pole.

Handle Points to Bright Star

By following the curve of the handle of the Great Dipper around to the west, one comes to Arcturus, in Bootes. Low in the southern sky, to the west of the south point, is a bright, reddish star. This is Antares and it is part of the scorpion, Scorpius. To the right is a vertical, curved row of stars, which form the claws of the insect. His tail extends the other direction like a great fishhook, with the point directed upwards. Next to Scorpius, just above and to the left of the tail, is Saggittarius, the archer. In this group can be found the third dipper of the skies, the little "Milk Dipper." The bowl, which is turned downwards, is formed by a quadrilateral of stars and the handle comes from them to the right. This group also forms the outline of a well-shaped teapot. The bowl of the dipper forms the handle of the pot, the star at the end of the handle the lid, and a triangle of stars to the right the spout. It is said that the teapot is emptying its hot tea upon the tail of the scorpion, just below!

Next to Sagittarius is Capricornus, the sea-goat, already mentioned as the location of Saturn, but containing no very brilliant stars. Then comes Aquarius, the water-carrier, near the horizon. These last mentioned constellations, Scorpius, Sagittarius, Capricornus and Aquarius, as well as Virgo, in the west, are some of those that mark the zodiac, the path of the sun, moon and the planets.

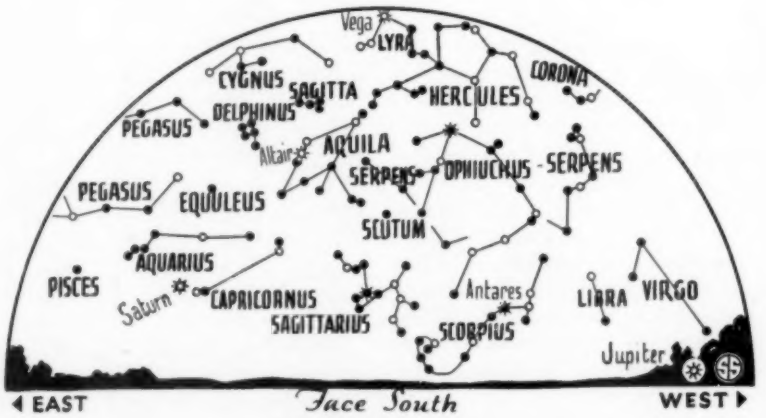
Vega Overhead

Directly overhead is a bright star, Vega, marking Lyra, the lyre. Below it to the southeast is a slightly fainter star, attended closely above and below by fainter stars, Altair, in Aquila, the eagle. Below Vega to the northeast is Deneb, in Cygnus, the swan, sometimes called the "Northern Cross." Deneb is at the head of the cross, or the tail of the swan. The bird's long neck stretches between Lyra and Aquila, and his wings, on either side, are outstretched in flight. Below Cygnus, directly in the east, is the "great square," part of Pegasus, the winged horse. As seen now, the square stands upon one corner. The star at the left corner is not in Pegasus, but in Andromeda, the chained maiden, who extends northwards near Cassiopeia, her mother, in mythological lore. These are the principal groups of stars that appear in the evening skies in August. Learn to know them, and you will have friends that will greet you in widely scattered parts of the world, like a breath from home.

Partial Eclipse

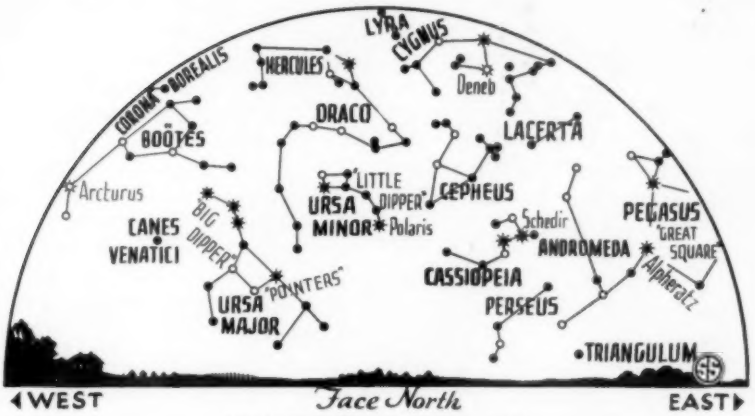
A very interesting astronomical event of August is, unfortunately, not visible from any part of the United States. On August 10 people living in central and southern Africa will see a partial eclipse of the sun. From a belt passing across Rhodesia the moon will be seen to pass directly in front of the sun. Despite this, however, there will not be a total eclipse, because this happens when the moon is nearly at its greatest distance from the earth, and its apparent diameter is smaller than that of the sun. The result is that the moon fails completely to cover the sun, but a ring, or "annulus," of sunlight remains visible around it. Thus, it is called an annular eclipse. Such eclipses, while interesting to

✲ ✷ ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



RINGED SATURN

If you have a small telescope, look this month for the rings of Saturn, visible from sunset to sunrise. If you have no instrument, you may distinguish this planet by its steady yellowish light.



HEAVENLY "LANDMARK"

The Great Dipper in the northern skies is a convenient starting point for discovering other familiar stars. The pointers carry your eye to the pole star; the curve of the handle to Arcturus.

watch, are of practically no scientific value in making possible observations which can not be made at other times. Consequently no expeditions of astronomers are going to Africa, as they would if the eclipse were total. Even the small remaining ring of sun is enough to blot out the faint light of the corona, its outermost layer.

An Elliptical Orbit

Every 29½ days, approximately, the moon travels once in its orbit around the earth. This orbit is not circular, but elliptical, and so the distance between the two bodies varies. This month the moon is most distant from the earth, at "apogee," on August 8 at 4 p. m., eastern standard time. Then it will be 252,510 miles from the earth. At 3 p. m. on the twenty-third, the moon will be closest, or at "perigee," and then only 226,650 miles will separate us. One effect of this is on the tides in our oceans. Tides are caused by the attractions of the moon and of the sun. As the intensity of this tide-producing force varies with the cube of the distance of the source, this difference of approximately 26 million miles produces a considerable effect. So the tides are greater at perigee than at apogee.

Now the moon plays a large part in causing the tides, but many ages ago, according to a widely held theory, the tides caused the moon. This was suggested late in the nineteenth century by Sir George Darwin, whose place in physical science is nearly as great as that of his father, Charles, in biology. This tidal theory is quite mathematical in its details. It assumes that the earth was originally a globe of liquid, with no moon, and which turned once in five hours instead of twenty-four. The tides set up on this liquid earth by the attraction of the sun gradually became larger and larger, finally becoming so high that a piece broke off. This piece eventually formed the moon.

As the tides travel around the earth, pulled now by the attraction both of the moon and the sun, there is a certain amount of friction, especially where they pass over shallow areas like the Bering Sea or through narrow straits. Slight as it is, it causes a braking action which is gradually making the earth turn more slowly. On the other hand, the tides formed on the earth, also attract the moon in such a way as to make it speed up slightly. The faster a sling-shot is whirled about, the farther the stone tries to get from the center of the motion. So the speeding up of the moon makes it move a little farther from the earth. But when a celestial body that is revolving around another is farther away, it moves more slowly in its larger orbit, and so the net effect of the speeding up of the moon is to make it move more slowly around the earth. According to the theory of Darwin, this process still continues, even though it is exceedingly slow, and the time will come when the day and the month will both be about fifty-five of our days, the earth always keeping the same face towards the moon just as the moon does now towards the earth.

During August the moon, then in a crescent phase, passes by Jupiter on the fifteenth, with the planet about thirteen moon diameters to the south. On the twenty-fourth it passes Saturn more closely at about half that distance. The planet Mercury may, perhaps, be seen low in the western sky just after sunset at the very beginning of the month, for it was at its greatest distance east of the sun on the last day of July. Venus and Mars are close together, and may be seen in the eastern sky just before sunrise. The moon, again a crescent, passes them on the seventh, and the three objects will be an interesting spectacle that morning. Venus is the more brilliant, and Mars is red in color, so there should be little difficulty in distinguishing them.

Science News Letter, August 4, 1934

PHYSICS

Magnetic Objective For Electron Microscope

A MICROSCOPE which uses electrons instead of light rays to "see" tiny objects has been developed by Dr. E. Ruska and reported in the German scientific publication *Zeitschrift für Physik*. By magnification in two stages the German scientist has obtained a device capable of enlarging the apparent size of things some 10,000 times. The maximum magnification usually possible with ordinary optical instruments is 3,500 times.

Whether electrons or light rays are used in a microscope they must be brought to a focus. For electrons a magnetic field is used for this purpose since the electron's charge makes it react in a magnetic field.

The electron microscope, developed by Dr. Ruska, has theoretically a resolving power a thousand times greater than that of a microscope using light,

Phases of the Moon

		E. S. T.
Last Quarter	August 2	1:26.9 a. m.
New Moon	August 10	3:45.6 a. m.
First Quarter	August 17	11:32.9 p. m.
Full Moon	August 24	2:36.7 p. m.
Last Quarter	August 31	2:39.9 p. m.

because the wavelength corresponding to the electron is a thousand times shorter than that of ordinary light. But to realize this power, strongly converging or short focus objectives are required. Glass lenses cannot be used. Electric or magnetic fields take their place, and bend or converge the electron streams just as lenses bend or focus light rays.

One could use a series of low power objectives one after the other in a series of stages. But this would make the microscope unduly long and cumbersome. The development of a high power magnetic objective that will give a magnification of 10,000 diameters in two stages is therefore a considerable step in advance.

Science News Letter, August 4, 1934

PHYSICS

Rotor Spins With Force Million Times That of Gravity

A "ROTOR" spinning 160,000 times a minute (over 2,600 revolutions a second) has been constructed by the Swedish Nobel prize winner, Prof. The Svedberg for investigating the behavior of proteins, the material of which living matter is composed.

Protein placed in Prof. Svedberg's apparatus at the University of Upsala, Sweden, when whirled at such speeds has acting upon it centrifugal force a million times the force of gravity.

The enormous force acting outward on the material is sufficient to separate the small protein molecules from the water in which they are dissolved. By watching the rate of motion of the protein molecules their size and weight can be calculated.

In operation the protein is placed in tiny chambers having quartz windows through which the happenings can be photographed. Both ordinary and ultraviolet light are used for illumination.

Prof. Svedberg and his coworkers, G. Boestad and I.-B. Eriksson-Quensel, report their results and difficulties of the work in the British scientific journal *Nature*.

Hemoglobin, for example, when rotated in a centrifugal field equal to 900,000 times gravity moves outward in such a way that it is known that the particles of which it is composed must be the same size. There were 2,400 whirls a second.

So great is the force generated by the rapid rotation that several of the little "rotors" flew apart and "exploded."

Science News Letter, August 4, 1934

PHYSICS

Better Standards Proposed For X- and Gamma Ray Strengths

SUGGESTIONS for standardizing measurements of X-ray and gamma ray intensities which should aid medical science in the treatment of cancer by radiation were advanced by Dr. Gioacchino Failla before the Fourth International Congress on Radiology.

Dr. Failla is chief physicist at Memorial Hospital in New York City and one of five American delegates to the Congress.

At present the proper doses of X-rays can be determined with considerable accuracy but deciding the right dose of gamma rays from radium is less certain. In practice, rule-of-thumb tests known from experience often serve as a gauge by which the conflicting and scattered observations of many investigators are judged.

The present unit for measuring X-ray and gamma ray intensities, Dr. Failla declared, is the roentgen or R unit. Two ray beams are now compared by the amount of ionization, or atmospheric electricity, which they will produce in a small air chamber at fixed distances from the source.

For X-rays, where the length of the waves is not so short, the method works with some success. For gamma rays, having much shorter wavelength, the ionization method of determining intensity does not work so well. This is due in part, Dr. Failla said, to the fact that what really needs to be known about a gamma ray beam is its effect on body tissues.

What science now tries to do is to take ionization produced in air and apply the results to tissue which is 800 times more dense. For X-rays this discrepancy seems to make little difference but it does matter for the more penetrating gamma rays.

Dr. Failla suggests that the intensity of gamma rays be determined by the ionization they produce in liquid air rather than in gaseous air. Liquid air and human tissue do not differ greatly in density. It is to be hoped that conditions could thus be achieved approximating more closely those found in actual treatment.

Science News Letter, August 4, 1934

ASTRONOMY

Horizontal Telescope Will Aid Astronomer's Comfort

WHEN Gustavus Wynne Cook, banker, manufacturer and amateur astronomer of Philadelphia, Pa., wishes to observe the stars next winter from his private observatory at Wynnewood, near Philadelphia, he will not have to do it from a cold observatory, where the temperature inside and out must be the same.

From a steam heated room he will use a telescope projecting horizontally in through one wall, and by means of remote electrical controls he will operate a 25-inch diameter mirror outside which will reflect the star light into the 15-inch lens of the telescope. A series of dials, electrically connected to the mirror, will enable him to tell where it points, and to set it accurately to any astronomical body within reach. An accurately adjusted electric motor, operating in a manner similar to the electric clocks that one attaches to the lighting circuit, will keep the mirror moving steadily. Thus it will compensate for the earth's turning, and will remain pointed to the star.

This is called a siderostat telescope, and it is believed to be the first of its kind in the United States. It is now reaching completion in the telescope works of J. W. Fecker, in Pittsburgh, and it will be installed within the next few weeks. Already Mr. Cook has several other instruments, including two

special telescopes for the study of the sun and a 28½-inch reflecting telescope. This instrument is now in regular use in cooperation with the Sproul Observatory of Swarthmore College. It is being used with a spectroscope in a research program measuring the speeds at which the stars are moving towards or away from the solar system.

Science News Letter, August 4, 1934

ORNITHOLOGY

First Ptarmigan Hatched In Captivity at Cornell

"STRONG and doing well" is the nursery bulletin on the first ptarmigan baby to be hatched in captivity.

Dr. A. A. Allen, head of Cornell's ornithology department, collected freshly laid ptarmigan eggs on an expedition to the Canadian outpost, Churchill on Hudson Bay. Bantam hens were persuaded to act as foster mothers in hatching the eggs which he rushed from Churchill to Ithaca. Out of 18 eggs set, only one hatched.

Related To Ruffed Grouse

The six weeks trip from which he has just returned was spent at Churchill, a small trading outpost 1,000 miles north of Winnepeg, and vicinity, and was for the purpose of making comparative studies of the ptarmigan, noting the similarities in life history between it and our common ruffed grouse, to whom it is closely related. Dr. Allen, an authority on the habits and breeding of grouse, has succeeded in rearing the birds free from the parasitic disease which is fast making this species of bird almost extinct.

Gathering the eggs of the ptarmigan for hatching was a difficult matter, since they had to be freshly laid in order to survive transportation. Dr. Allen reports that spring had just come to the north country when he left for the return trip. The ice was breaking up in Hudson Bay and great numbers of white whales and seals had put in an appearance. A snowstorm occurred the week before he returned and drifts as much as eight feet deep could be seen.

To Continue Study

Scientists left by Dr. Allen at Churchill to continue the study of Canadian birds have sent back another set of twenty eggs which are now being hatched. Several eggs have already been broken by the foster hen mother, but it is expected that there will soon be more hungry mouths in Cornell's ptarmigan nursery.

Photographs and motion pictures of numerous little-known birds were also obtained. Among them were the golden plover and the arctic tern, which have the longest migrations of any birds known to science; the plover winters in southern South America, and the tern in the antarctic.

Pictures were also made of the Hudsonian curlew and the Harris sparrow, which is of especial interest to Cornell since Dr. George M. Sutton of the Cornell faculty was the first scientist to discover its eggs, during a trip to Churchill.

Accompanied By Students

Dr. Allen was accompanied by three Cornell graduate students who have remained at Churchill to work. They are Fred M. Baumgartner of Indianapolis, Miss Margaret Heydweiller of Rochester, and Miss Theodoro Cope of Dimock, Pa. Prof. Guy Bailey of Geneseo State Normal School, who was also of the party, returned with Dr. Allen.

Science News Letter, August 4, 1934

ZOOLOGY

Tax Collector Takes Prince's Last Buffalo

COMPLAINING taxpayers in America, who groan that the tax collector is going to "take their last buffalo nickel," are better off at that than Prince Pless. Polish tax collectors, alleging unpaid arrears of four million marks, have taken his last buffalo—or more properly his last wisent.

The prince had nine of these exceedingly rare animals, zoological first cousins of the beasts that made Buffalo Bill famous, on his estate in Polish Silesia. Now the Polish authorities have them. They check them off against the prince's alleged unpaid taxes at a valuation of 5,000 zloty (about 2,500 marks) per head.

It is considered probable that the Pless wisent will be purchased by the Polish Agricultural (*Turn to Next Page*)

FIRST TO HATCH IN CAPTIVITY

Nestling in a human hand, this little ptarmigan or northern grouse is the first baby of its kind to be hatched in captivity. The event was thus recorded photographed by Dr. A. A. Allen, head of Cornell's ornithology department, who collected a setting of 18 ptarmigan eggs. Only the one baby successfully hatched.

Ministery, to be added to a small herd of the animals already living on a preserve at Bialosies.

Wisent, which look very much like the American bison or buffalo and are closely related to them, were quite common in European forests during ancient times. Modernly, however, their number dwindled, and the incidents of war and the post-war revolutions have almost exterminated the species. A few dozen survivors are being carefully tended in several European parks and game refuges, in the hope of building up the stock again.

Science News Letter, August 4, 1934

MEDICINE

Only Few Children Acquire Dreaded Infantile Paralysis

INFANTILE paralysis is the most dreaded of all childhood diseases, yet comparatively few children are attacked by it and of those few only a small proportion suffer from the paralytic form, says Dr. W. T. Harrison, surgeon of the U. S. Public Health Service, who has made a special study of the disease.

The great dread parents have of the disease is due to the very severe crippling which sometimes follows the infection. But the paralytic form of infantile paralysis is probably one of the least prevalent diseases of childhood. Even in epidemics seldom more than three or four children in a thousand are affected.

"Infantile paralysis can not be compared in infectiousness to such diseases as, for example, measles and chickenpox, to which practically all children are susceptible," Dr. Harrison declared.

Re-education Greatest Advance

"The greatest recent advance in the treatment of infantile paralysis has been made in the re-education and training of paralyzed muscles," Dr. Harrison pointed out. "The treatment should begin during the acute stage of the disease in that proper splinting of affected muscles should be done to bring about complete quiet and to prevent deformity. As soon as the pain has disappeared massage and passive movements should be begun, followed by continued, consistent effort toward active control of muscles. Baths are valuable for the support of paralyzed members during muscle exercise. The treatment requires great perseverance, the direction must be sympathetic and expert, and can best be done by specially trained personnel not connected with the patient's family. Seemingly hopeless cripples can have a great deal of muscle function restored, but regular systematic exercise must be continued for as long as two years from the acute illness."

If there is an epidemic, young children should be kept as far as possible within their usual environment and away from crowds, he advises. The disease is most prevalent during vacation time, so only necessary travel should be undertaken by children as they should not be taken from a district where infantile paralysis is not prevalent into one where there is an epidemic. During epidemics a physician should see all children showing any sort of upset associated with fever.

Dr. Harrison spoke over the Columbia Broadcasting System under the auspices of Science Service.

Science News Letter, August 4, 1934

ICHTHYOLOGY

Fish Census Shows Record Population in Yellowstone

A RECORD population of trout is available to anglers in Yellowstone Park, Wyoming, this summer. This is the report of a trout "census" just completed by the U. S. Bureau of Fisheries.

Basing their calculations on the number of eggs collected in the hatcheries this year, government experts estimate 75,000 to 80,000 as an absolute minimum for the trout population.

The season's take of eggs is the highest on record. The total muster of 38,190,000 eggs exceeds the mark of 1924, the previous record year, by about 6,000,000.

The eggs are secured from trout trapped on their spawning migration. Records show the average yield of eggs per female trout is about 900. Thus it took 42,000 females to produce the number of eggs collected. Since the males and females are approximately equal in number, the Bureau of Fisheries experts were able to compute the total population.

Fishermen in many other National Parks will benefit from the Yellowstone haul. Content with a record number of parent fish in their rivers, the Yellowstone Hatchery will distribute the newly-born small fry among other parks that need restocking.

Science News Letter, August 4, 1934

ZOOLOGY

Flowing Lava Streams Saved Hawaiian Goats

IN CIRCLING the Big Island on his first day ashore in Hawaii, President Roosevelt may have skirted along a coastal apron where Mauna Kea has laid out her series of goat sanctuaries which, a century ago, lured the milch animal of the Mediterranean back to the wild and since has made it big game for sportsmen.

Mauna Kea, which is the highest island mountain in the world, rises from sea level almost to the altitude of Pike's Peak. It is a much larger mountain than the Colorado patriarch which starts from a mile-high plain. Until recently it was a volcano and sent many lava flows down its sides just as Mauna Loa, its twin sister not far away, is still doing.

These lava streams, like so many rivers of liquid fudge, flowed slowly and their surfaces, hardening, were broken up into jagged-edged masses. So were areas created that defied cow or horse or man yet were negotiable to the nimble feet of the goat. The lava flows became the empire of the goat.

Far away as Hawaii seems, it still is a wholly American, English-speaking community such as might exist in the cattle country anywhere along the Rockies or the Sierra Nevadas.

Domestic animals were unknown to the Hawaiians before white man came but the discoverer, Captain James Cook, who came to Hawaii while the Revolutionary War was being fought, put two ewes and a ram ashore. A tabu against killing them was declared and ancient Hawaiians revered tabus.

The goats multiplied inordinately. They spilled over into the wild areas up the side of Mauna Kea. When Americans came they saw this mountain area with eyes that knew the slopes of the Huachuca Range in Arizona and the Snake River country in Montana. They recognized it as cattle country. They es-

tablished cattle ranches. They drove out the goats.

But neither they nor their herds could penetrate the lava flows. Here the goat remained supreme. Here he ranges to this day in countless numbers.

Hawaii is without deer, or antelope, or gnu or hartbeest. She has no native big game. But she has her goats, gone back to the wild a hundred years ago in the lava flow country. Here huntsmen of the mid-Pacific come for the only big game shooting that the Islands have to offer. Here they find a quarry that is wisely elusive, fleet of foot, conscious of its fastnesses of impenetrability, that offers an opportunity for finesse in hunting that is not presented anywhere else in all the world.

Science News Letter, August 4, 1934

PHYSICS

Attain Accuracy in Measuring To One Part in 20,000,000

With Spectroscope, Scientists Have Measured One Ten-Thousandth of an Angstrom or One Trillionth Cm.

ACCURACY comparable to that required to measure the distance from New York to Chicago with an error of about three inches at most was ascribed to the spectroscope at the final session of the Second Annual International Spectroscopy Conference meeting at the Massachusetts Institute of Technology.

Dr. Ralph A. Sawyer of the University of Michigan and Dr. William F. Meggers of the National Bureau of Standards told the 150 scientists assembled that the spectroscope is undoubtedly the most accurate instrument of its kind known to science.

The super-sensitivity of the instrument is better appreciated when it is realized that instead of measuring a distance of 1,000 miles, the distance from New York to Chicago, the spectroscope measures distances of approximately one eight-thousandth of an inch.

In measuring wavelengths scientists use as a unit the angstrom, defined as one one-hundred-millionth of a centimeter, there being roughly two and one-half centimeters in an inch. Dr. Sawyer said that with the spectroscope in measuring wavelengths of approximately 5,000 units, accuracy to one part in twenty million had been attained. Scientists have measured wavelengths to eight significant figures, measuring with accuracy one ten-thousandth of these tiny angstrom units.

Scientists, however, are not yet satisfied and feel that there is a need of even a higher degree of accuracy. Dr. Sawyer expressed the opinion that with improved equipment and the finer technique that is being steadily developed, this need will be fulfilled within a relatively short time.

This need is particularly felt at present in measuring ultraviolet and infrared wavelengths. In visible light, fairly satisfactory standards of measurement have been established.

Discussing this point, Dr. Sawyer said he believed that increased dispersion in the use of the spectroscope would aid in eliminating the various types of interference which now hinder the establishment of satisfactory standards.

Dr. Meggers described his work with the so-called noble gases, argon, neon, xenon and krypton. He illustrated his lecture with lantern slides of the spectra of these gases which he has photographed. He explained their remarkable clarity as compared with other spectra shown, as due to the fact that these gases are composed of heavier atoms.

Science News Letter, August 4, 1934

▼RADIO▲

SCIENCE AND RECOVERY

an address by

Dr. A. M. MacMahon

Curator of the Department of Physics, Museum of Science and Industry, Chicago

Wednesday, Aug. 8, at 3:30 p. m., Eastern Standard Time, over Stations of the Columbia Broadcasting System. Each week a prominent scientist speaks over the Columbia System under the auspices of Science Service.

BOTANY

NATURE RAMBLINGS

by Frank Thone

Ferns For Food

MAN'S staple food plants are all prehistoric: wheat, rice, corn, potatoes, beans, onions, were all brought into cultivation long before writing was invented. Yet there are still-untamed things growing in the woods that can be used for food if we wish.

Charles Francis Saunders, a California botanist, has gathered together a whole bookful of lore about these possible but as yet unrealized wild food resources.

Mr. Saunders writes:

"What would you say to a dish of ferns on toast? It is quite feasible in the spring, if the Common Bracken (*Pteris aquilina, L.*) grows in your neighborhood—that coarse, weedy-looking fern with long, cord-like creeping root-stocks and great, triangular fronds topping stalks one to two feet high or more, frequent in dry, open woods and in old fields throughout the United States—the most abundant of ferns. The part to be used for this purpose is the upper portion of the younger shoot, cut at the period when the fern shoot has recently put up and is beginning to uncurl. The lower part of the shoot, which is woody, and the leafy tip, which is unpleasantly hairy, are rejected. It is the intermediate portion that is chosen, and though this is loosely invested with hairs, these are easily brushed off. Then the cutting, which resembles an attenuated asparagus stalk, is ready for the pot. Divided into short lengths and cooked in salted, boiling water until quite tender—a process that usually requires a half to three quarters of an hour—the fern may be served like asparagus, as a straight vegetable, or on toast with drawn butter, or as a salad with French dressing. The cooked fern has a taste quite its own, with a suggestion of almond.

Science News Letter, August 4, 1934

First Glances at New Books

Psychology

ARTHUR TRENT: CHOOSING A CAREER—Augustus W. Trettien—*Stratford,* 312 p., $2. The problems, experiences, and difficulties met vicariously by the author in his clinic woven together into a semi-fictional tale of human life and development.

Science News Letter, August 4, 1934

Education-Government

EDUCATION AND GOVERNMENT—Arthur Twining Hadley—*Yale University Press,* 210 p., $2.50. Essays and commencement addresses by the late president of Yale University and most of them previously published in *Harpers Magazine* and *The Yale Review.* A brief biographical note is added.

Science News Letter, August 4, 1934

Education

MOTION PICTURES IN EDUCATION IN THE UNITED STATES—Cline M. Koon and others—*University of Chicago Press,* 106 p., $1. A report prepared in response to a request from the director of the International Educational Cinematographic Institute that the United States Office of Education cooperate in the preparations for the International Congress of Educational and Instructional Cinematography.

Science News Letter, August 4, 1934

Psychology

INTRODUCTION TO EDUCATIONAL PSYCHOLOGY—Harlan Cameron Hines—*Van Nostrand,* 381 p., $2.20. A clearly written and interesting textbook including fundamental principles of psychology intimately combined with their educational applications.

Science News Letter, August 4, 1934

Parasitology

COCCIDIA AND COCCIDIOSIS OF DOMESTICATED, GAME AND LABORATORY ANIMALS AND OF MAN—Elery R. Becker—*Collegiate Press, Inc.,* 147 p., $2.50. The parasites which are the subject of this monograph are important because of the great economic loss they cause among domesticated animals in the temperate zone. Dr. Becker's book will prove a valuable aid to research workers in this field.

Science News Letter, August 4, 1934

Parasitology—Public Health

PARASITISM AND DISEASE—Theobald Smith—*Princeton University Press,* 196 p., $2. This volume consists of nine lectures given on the Vanuxem Foundation at Princeton University by one of the leading authorities on parasites and their relation to disease in man and other animals. Although the lectures were given to undergraduates presumably without much technical scientific training, it will be hard reading for the layman without a scientific vocabulary. On the other hand, this general discussion of an important subject by an eminent authority will undoubtedly appeal to many readers.

Science News Letter, August 4, 1934

Mathematics

ÉTUDE DES FONCTIONS SOUSHARMONIQUES AU VOISINAGE D'UN POINT—Marcel Brelot—*Hermann et Cie., Paris,* 55 p., 14 francs.

Science News Letter, August 4, 1934

Mathematics

ZERFALLENDE VERSCHRANKTE PRODUKTE UND IHRE MAXIMALORDNUNGEN—Emmy Noether—*Hermann et Cie., Paris,* 15 p., 5 francs.

Science News Letter, August 4, 1934

Mathematics

PROPRIÉTÉS DES ESPACES ABSTRAITS LES PLUS GÉNÉRAUX—Antoine Appert—*Hermann et Cie., Paris,* 2 vol., 12 francs each.

Science News Letter, August 4, 1934

Mathematics

LA THÉORIE DES SURFACES ET L'ESPACE RÉGLÉ—Lucien Godeaux—*Hermann et Cie., Paris,* 36 p., 12 francs.

Science News Letter, August 4, 1934

Mathematics

LES SURFACES ALGEBRIQUES NON RATIONNELLES DE GENRES ARITHMÉTIQUE ET GÉOMETRIQUE NULS—Lucien Godeaux—*Hermann et Cie., Paris,* 33 p., 10 francs.

Science News Letter, August 4, 1934

Mineralogy

SULPHUR, AN ESSENTIAL TO INDUSTRY AND AGRICULTURE—*Texas Gulf Sulphur Company,* 45 p., free.

A pamphlet describing the history, occurrence, mining, uses and properties of sulphur.

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Mental Hygiene

CHILD GUIDANCE CLINICS: A QUARTER CENTURY OF DEVELOPMENT—George S. Stevenson and Geddes Smith—*Commonwealth Fund,* 186 p., $1.50. Beginning as an adjunct to the courts, the child guidance clinic today has a much broader function in the salvaging of children with a wrong psychological start in life. Only a brief portion of the volume is devoted to retrospect; a goodly share is given to a survey of present conditions and plans and a glimpse toward the future. The senior author is director of the division on community clinics of the National Committee for Mental Hygiene.

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Mathematics

SUR QUELQUES PROPRIÉTÉS DES POLYNOMES—J. Dieudonné—*Hermann et Cie., Paris,* 24 p., 6 francs.

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Mathematics

SUR LES SUITES STATIONNAIRES—N. Lusin—*Hermann et Cie., Paris,* 19 p., 5 francs.

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Mathematics

L'ARITHMÉTIQUE DE L'INFINI—Maurice Fréchet—*Hermann et Cie., Paris,* 39 p., 10 francs.

Science News Letter, August 4, 1934

Technology

RAYON AND SYNTHETIC YARN HANDBOOK—Edited and compiled by E. W. K. Schwarz and Herbert R. Mauersberger—*Rayon Publishing Co.,* 420 p., $3.00 in U. S. A. An accumulation of data on the rayon industry. Contains history of rayon as well as technical information regarding its manufacture from the wood pulp stage to the ultimate weaving of the threads.

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Meteorology

WORLD WEATHER AND SOLAR ACTIVITY—Henry Helm Clayton—Smithsonian publication no. 3245—*Smithsonian Institution,* 52 p., 40c. Sixth paper in the series by the author giving results of the relation of solar activity to atmospheric changes.

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